Georgia Department of Transportation

# The GDOT ITS Strategic Deployment Plan

ITS-GA

October 2008



serco PBSJ

# Agenda

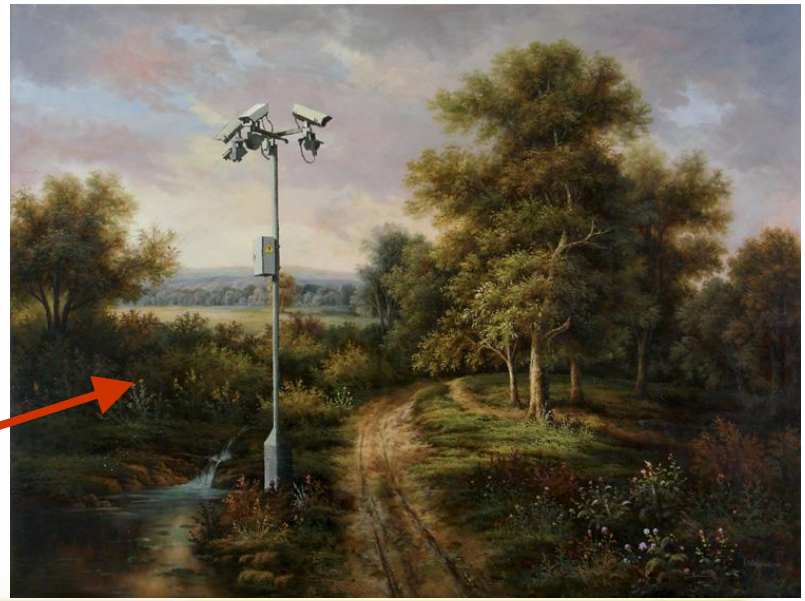
- **Why** was the SDP developed?
- **How** was the SDP developed?
- **What** is the SDP?
- **How** will the SDP be used?

# Why

- ITS was typically not included in early concept or budget for a project
- Adding ITS to a project resulted in:
  - Budget over-runs
  - Delays in project schedule
  - Or ITS just didn't get added

# Why

- GDOT began adding ITS consideration during project Concept
- Level of ITS deployment was inconsistent
  - Depended on the engineers involved
  - Take what we could get



***Inappropriate ITS Deployment***

**GDOT needed a methodology to**

**consistently have ITS included in projects**

**at the appropriate level of deployment.**

# **S**trategic **D**eployment **P**lan (SDP)

- Technology neutral
- Services based
  - Surveillance
  - Dissemination, etc.
- Statewide
- Guidance

# Stakeholder Outreach

- 3 weeks (Oct/Nov 2007)
- 19 Meetings
- 21 Agencies
- 63 People

| Group | People |
|---|---|
| GDOT | 25 |
| City/County | 20 |
| Consultants | 10 |
| Federal Highway | 1 |
| Airport | 3 |
| Other State Agency | 4 |

Question 1: How much (and what kind) of ITS is appropriate?

Question 2: ***How do you know?***

# Think of ALL ITS

- "Typical" ITS services
  - Surveillance (CCTV Cameras)
  - Detection (Video, Radar, Microwave)
  - Control (Signals)
  - Dissemination (DMS, HAR, www, 511)
- Don't Forget
  - Work Zones
  - Enforcement
  - Variable speed limits
  - Crash prevention and safety

More of the Same


# Describing a Road

- Functional Classification
- Rural/Urban
- Traffic Volumes
- Evacuation Route
- Other

# Different Roads = Different Needs?

Urban Principal Arterial

Urban Collector Street

Urban Local Street

Urban Minor Arterial

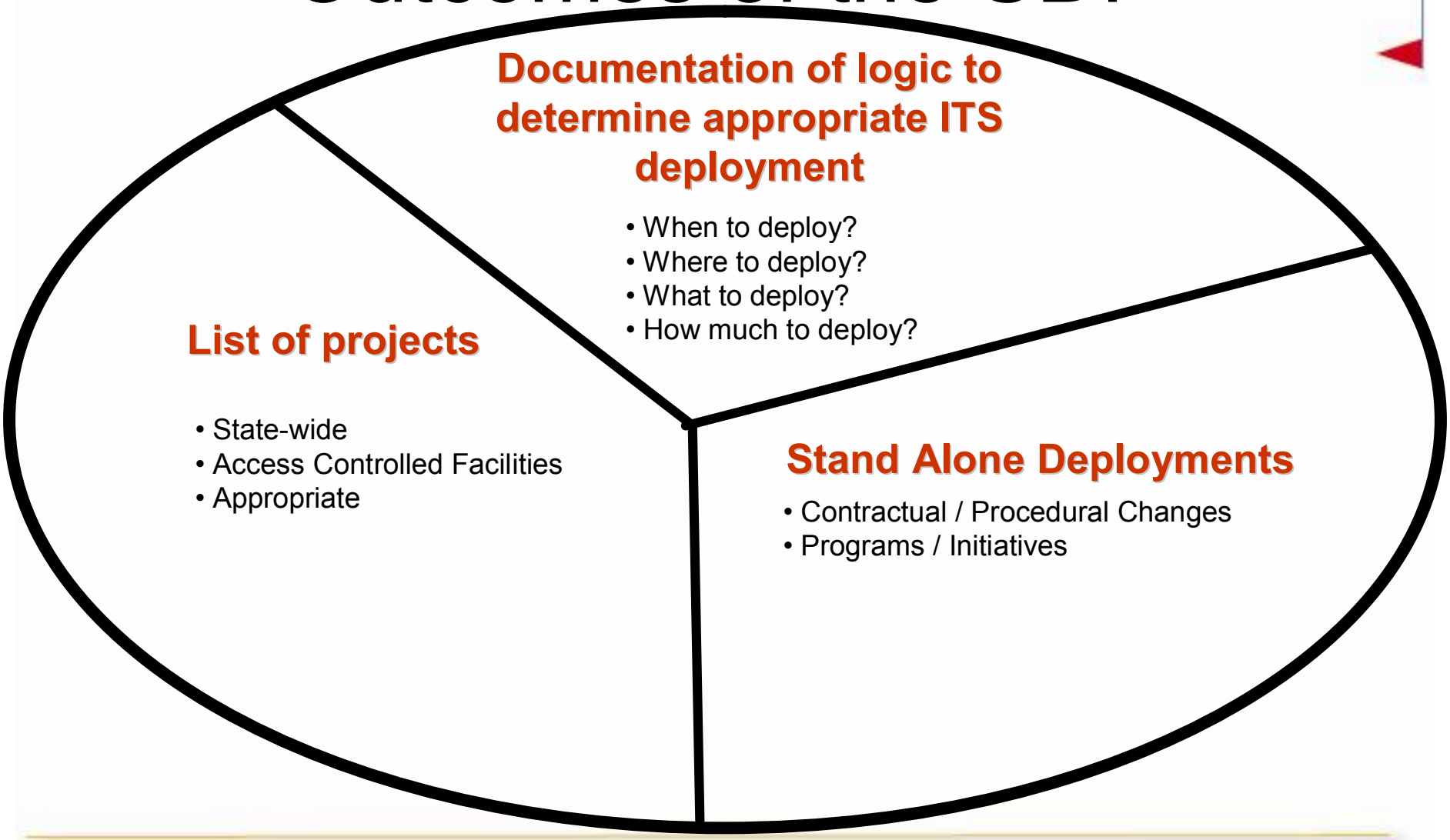
Rural Major Collector

Rural Local Road

Rural Principal Arterial

Rural Minor Collector

# Outcomes of the SDP



# SDP Logic – ITS Deployment

- Freeways
  - 3 levels defined
- Surface Street
  - 4 levels defined

**Engineering Judgment Required!**

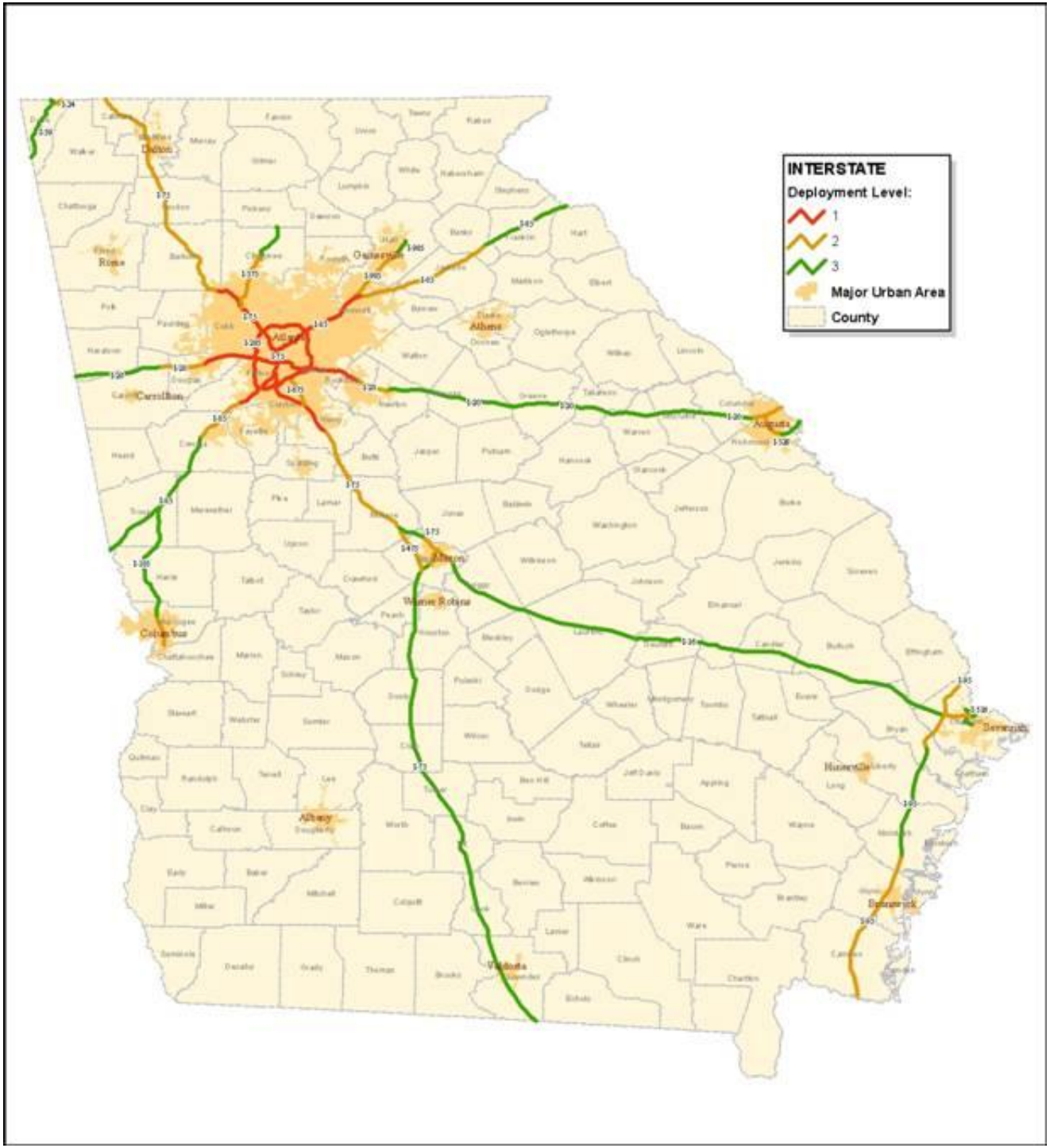
| Category | Freeway | Surface |
|---|---|---|
| Surveillance | ✓ | ✓ |
| Detection | ✓ | ✓ |
| Dissemination | ✓ | ✓ |
| Communications | ✓ | ✓ |
| Control | | ✓ |

# Freeway Deployment

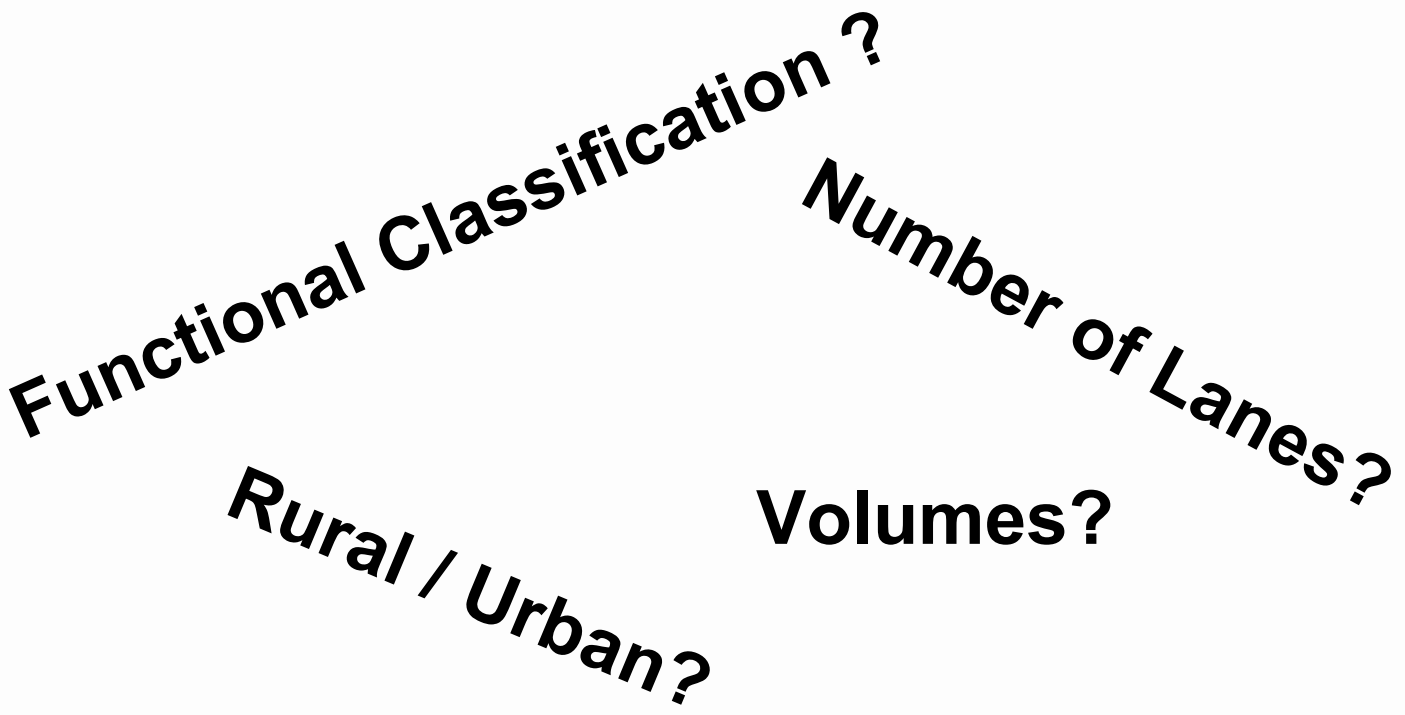
# Freeway Deployment

| | Freeways | |
|---|---|---|
| | Deployment Level | Refer to Section |
| Design Year AADT > 100,000 | 1 | 3.1.1 |
| 50,000 < Design Year AADT ≤ 100,000 | 2 | 3.1.2 |
| Design Year AADT ≤ 50,000 | 3 | 3.1.3 |

| Capability | Purpose | Freeway - Level 1 | Freeway - Level 2 | Freeway - Level 3 |
|---|---|---|---|---|
| Surveillance | Incident Management | At all interchanges | At all interchanges where the cost of power and communication is not extreme. | At all interchanges where the cost of power and communication is not high |
| | | Along mainline freeway to provide near-continuous coverage of the roadway | At midpoint between interchanges spaced more than 6 miles apart where power and communications costs are not extreme | At midpoint between interchanges spaced more than 10 miles apart where power and communications costs are not high |
| | | N/A | Provide surveillance to view roadway sections where local knowledge or experience indicates a need for surveillance. | |
| | Support Information Dissemination | At all CMS sites - Located to view CMS message | | |
| Detection | Incident Detection and Information Dissemination | Collect data at all interchanges | Collect data at all freeway interchanges where v/c ratios exceed 0.85 during peak hours | N/A |
| | | N/A | Collect data at all interchanges where power and communications costs are not extreme | Collect data at all interchanges where the cost of power and communication is not high |
| | | Collect data continuously along the roadway with a maximum spacing of data collection points of 0.5 - 1.0 mile | Collect data at midpoint between interchanges spaced more than 6 miles apart where power and communications costs are not extreme | Collect data at midpoint between interchanges spaced more than 10 miles apart where power and communications costs are not high |
| | Support ramp metering | Collect data along all freeway mainlines where ramp metering is installed | N/A | |
| Dissemination | Local Dissemination | Provide local dissemination 2 miles in advance of all freeway-to-freeway interchanges | Provide local dissemination 2 miles in advance of freeway-to-freeway major interchanges | |
| | | Provide local dissemination 2 miles in advance of freeway-to-major arterial interchanges | N/A | |
| | | Provide local information dissemination if appropriate to support special event generators (stadium, convention center, etc.) | | |
| | | Provide local information dissemination in advance of major diversion routes to support large-scale evacuations as identified in a Statewide Emergency Information Dissemination Plan | | |
| | Local Broadcast | Located to support other ITS deployments that require local broadcast information, such as RWIS and visibility warning systems | | |
| | | Located as identified in a Statewide Emergency Information Dissemination Plan | | |
| | Wide Area Broadcast | Provide all available data to traffic information dissemination networks such as 511 | | |


INTERSTATE
Deployment Level:
1
2
3
Major Urban Area
County
Atlanta
Athens
Augusta
Macon
Columbus
Albany
Savannah
Brunswick
Valdosta

# Surface Streets – ITS Needs



# Surface Streets – ITS Needs

- Primary
  - Operations and maintenance of traffic signals and signal systems
- Secondary
  - Traffic operations at special event locations
  - Evacuations
  - Traffic Information (collect and disseminate)

# Surface Streets – ITS Needs

## Spacing and Operations of Traffic Signals

# Surface Street Deployment

Coupling Index (CI) = $\frac{ADT/(\frac{1}{2}L)}{D} = \frac{ADT}{D(\frac{1}{2}L)}$

Where:
ADT = Average Daily Traffic on roadway section
L = Number of approach lanes carrying traffic
D = Distance between signals (feet)

# Surface Street Deployment

| | Surface Street | |
|---|---|---|
| | Deployment Level | Refer to Section |
| $CI_{avg} \geq 6$ or $D_{avg} \leq 2500'$ feet | 1 | 3.2.1 |
| $3 < CI_{avg} < 6$ or $2500' < D_{avg} < 5000'$ | 2 | 3.2.2 |
| $\leq 3$ or $D_{avg} \geq 5000'$ | 3 | 3.2.3 |
| $CI_{avg}$ = not applicable or No signals, or isolated signals | 4 | 3.2.4 |

$D_{avg}$ = Average Distance Between Signals (feet)

# ITS Deployment Levels on Surface Streets *

| Capability | Purpose | Surface Street - Level 1 | Surface Street - Level 2 | Surface Street - Level 3 | Surface Street - Level 4 |
|---|---|---|---|---|---|
| Surveillance | Observe traffic and signal operations | Provide surveillance to view traffic operations at all signalized intersections in coordinated signal systems | | | |
| | | Provide surveillance of signalized intersections where v/c ratios exceed 0.85 during peak hours | Provide surveillance of signalized intersections where v/c ratios exceed 0.90 during peak hours | Provide surveillance of signalized intersections where v/c ratios exceed 1.0 during peak hours | |
| | | Provide surveillance to view most of the roadway with a minimum of "blind" spots | Surveillance should cover major intersections and provide good overviews of the major roadway | Surveillance should cover major intersections or roadway sections where local knowledge or experience indicates a need for surveillance | |
| | Support signal maintenance and trouble shooting | Provide surveillance at signalized intersections located more than 1 hour of travel from maintenance facility | | Provide surveillance at signalized intersections located more than 2 hours of travel from maintenance facility | Provide surveillance at signalized intersections located more than 3 hours of travel from maintenance facility. |
| | Support Information Dissemination | At all CMS sites - Located to view CMS message | | | |
| Detection | Collect vehicle speed data for information dissemination | Measure traffic speed midway between major intersections and at other locations where ITS devices are located to achieve a maximum spacing of 2 miles | | N/A | |
| Control | Efficient traffic operation | Operate traffic signals in coordinated systems | Operate signals spaced within 2,500 feet of one another in a coordinated system | | N/A |
| | | N/A | For signals spaced less than 5,000 feet apart, consider operating signals with a CI** between 2 and 6 as a coordinated system | | N/A |
| Dissemination | Local Dissemination | In advance of major freeway interchanges where alternate routes exist and data is available about the conditions on the freeway | In advance of freeway interchanges where surface street v/c ratios exceed 0.85 and alternate routes exist and data is available about the conditions on the freeway | | N/A |
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# List of Projects

- All access controlled facilities
  - Provided to GDOT
  - Being investigated for addition of ITS components

# Stand Alone Deployments

- Contractual / Procedural Changes
  - Maintenance of traffic signal operations during construction
  - Contractual incentives for towing and clearance
  - ITS in work zones

# Stand Alone Deployments

- Programs / Initiatives
  - Develop ITS costs and benefits
  - Develop information dissemination master plan for evacuations
  - Crash prevention and safety systems
    - Spot deployments
  - Support other deployments

# Using the SDP

- Project Programming
  - ITS costs included in project from the beginning
- Project Concept
  - Define needs and ITS services to satisfy the needs
- Project Design
  - Appropriate ITS devices included in project at appropriate density
- Identify ITS-only Projects

# Using the SDP

Use of the SDP will be mandated in the next version of GDOT Plan Development Process

# Impact of the SDP

ITS is
"mainstreamed"
in Georgia

# Comments or Questions

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# Agenda

- **Why** was the SDP developed?
- **How** was the SDP developed?
- **What** is the SDP?
- **How** will the SDP be used?
- **Using** the SDP

# Why

- ITS was typically not included in early concept or budget for a project
- Adding ITS to a project resulted in:
  - Budget over-runs
  - Delays in project schedule
  - Or ITS just didn't get added

# Why

- GDOT began adding ITS consideration during project Concept
- Level of ITS deployment was inconsistent
  - Depended on the engineers involved
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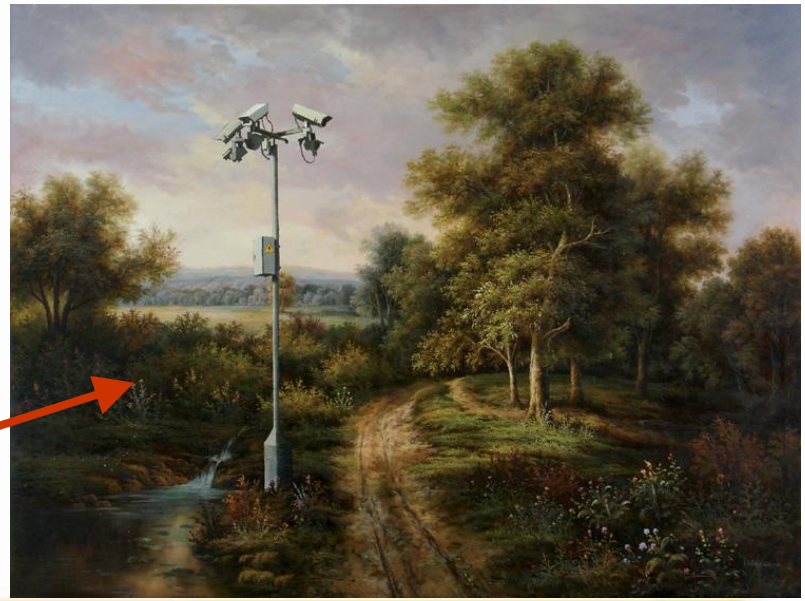

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| Detection | ✓ | ✓ |
| Dissemination | ✓ | ✓ |
| Communications | ✓ | ✓ |
| Control | | ✓ |

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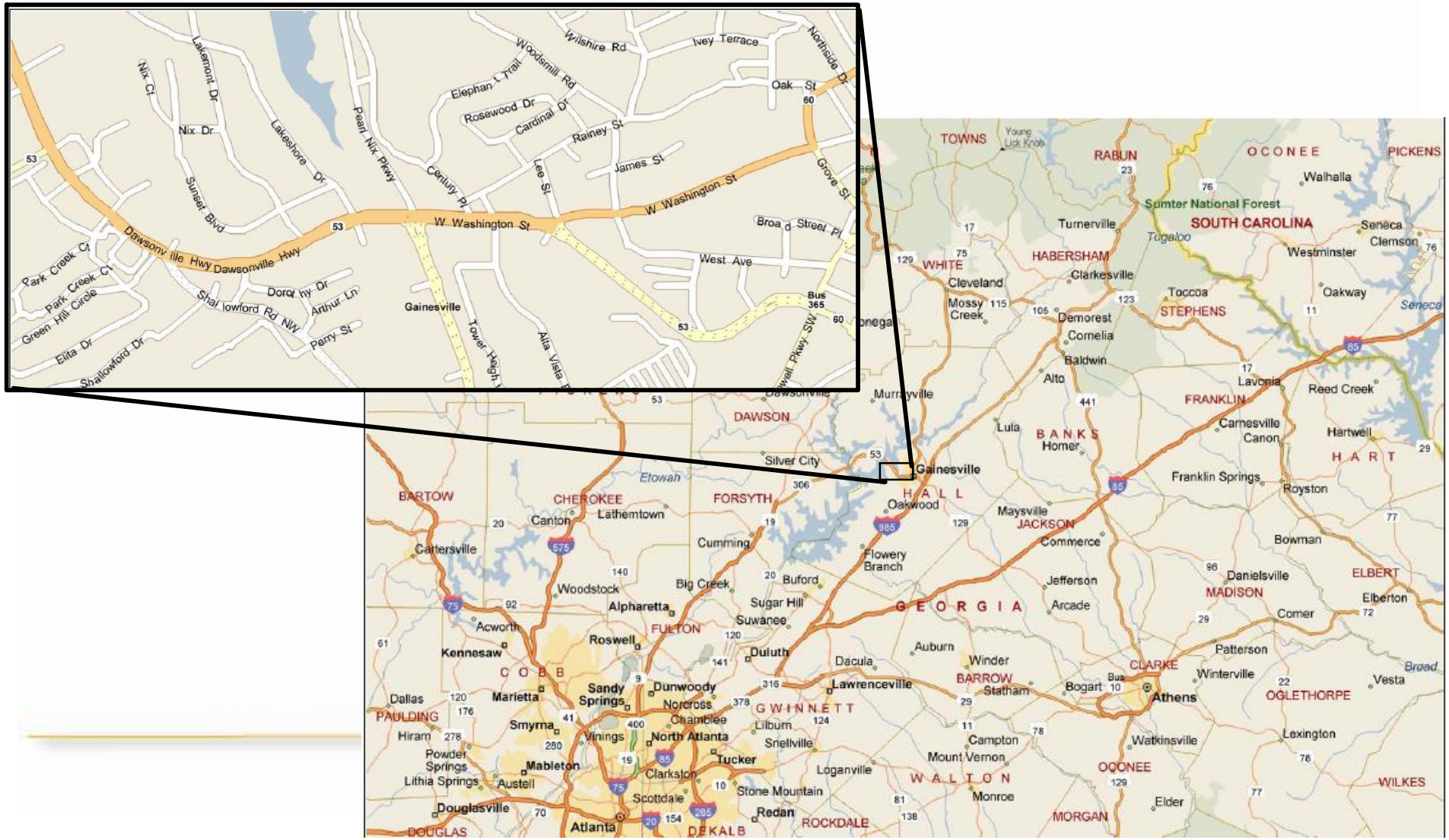
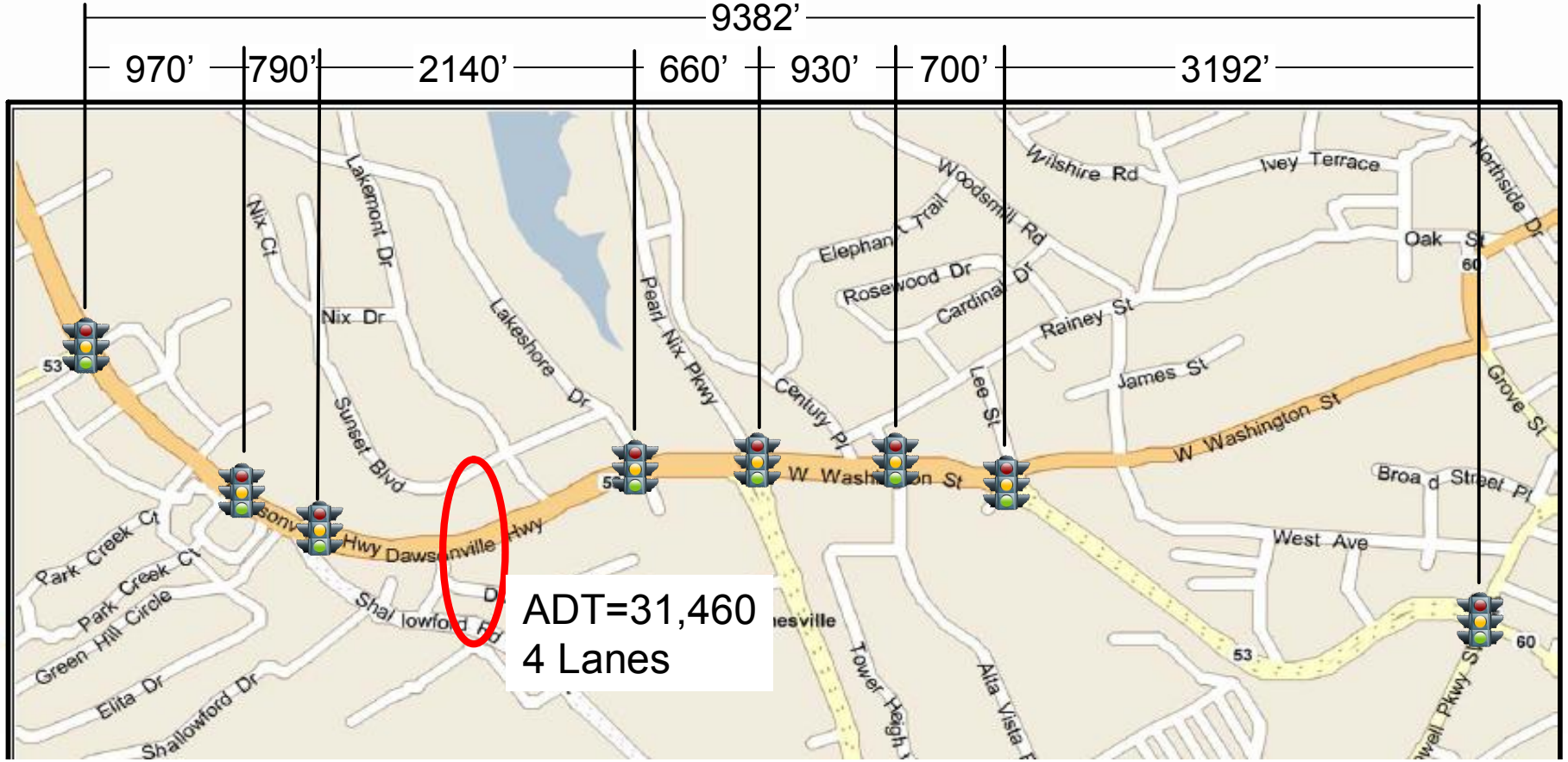
# Project Programming



# Project Programming

- Local agency will support ITS deployment
- Local agency has some ITS devices in place



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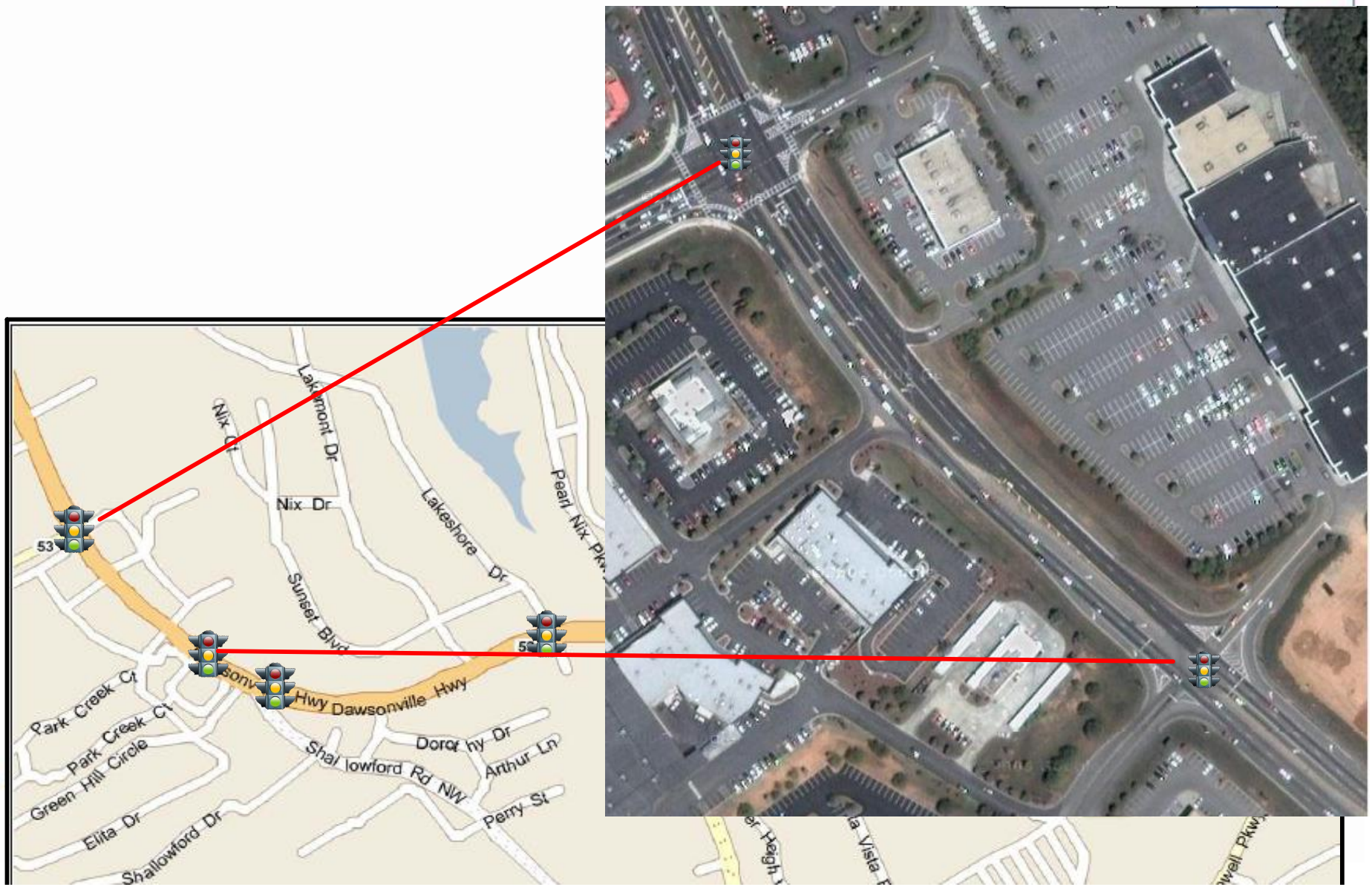

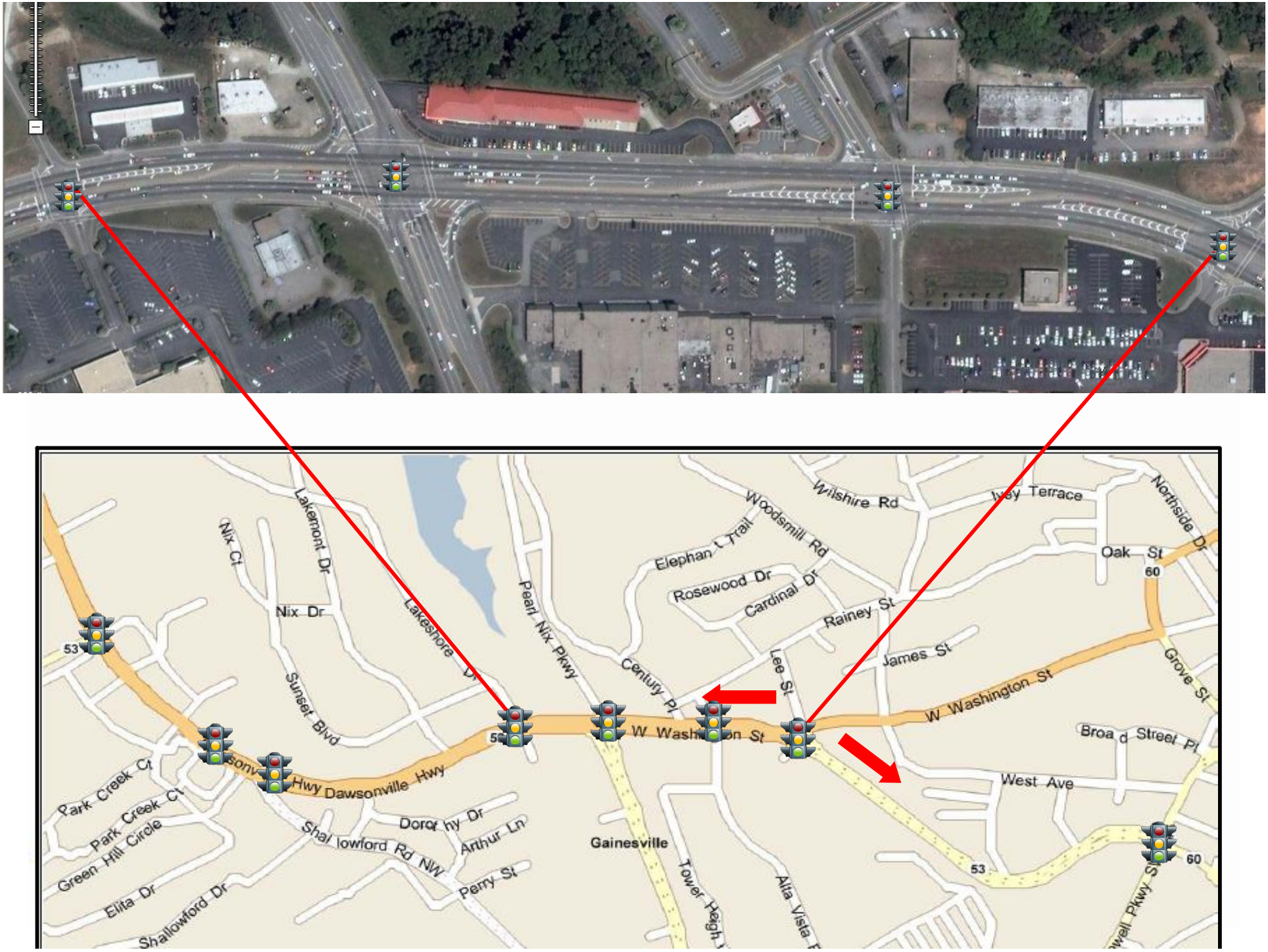
Wilshire Rd
Ivey Terrace
Northside Dr
Woodsmill Rd
Elephan t Trail
Oak St
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Rosewood Dr
Cardinal Dr
Rainey St
Nix Ct
Lakemont Dr
Nix Dr
Lakeshore Dr
Pearl Nix Pkwy
James St
Century Pl
Lee St
Grove St
W Washington St
53
Sunset Blvd
Broa d Street Pl
West Ave
Park Creek Ct
Park Creek Ct
Green Hill Circle
Hwy Dawsonville Hwy
Dorot hy Dr
Arthur Ln
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Gainesville
Perry St
Elita Dr
Shallowford Dr
Tower Heigh
Alta Vista
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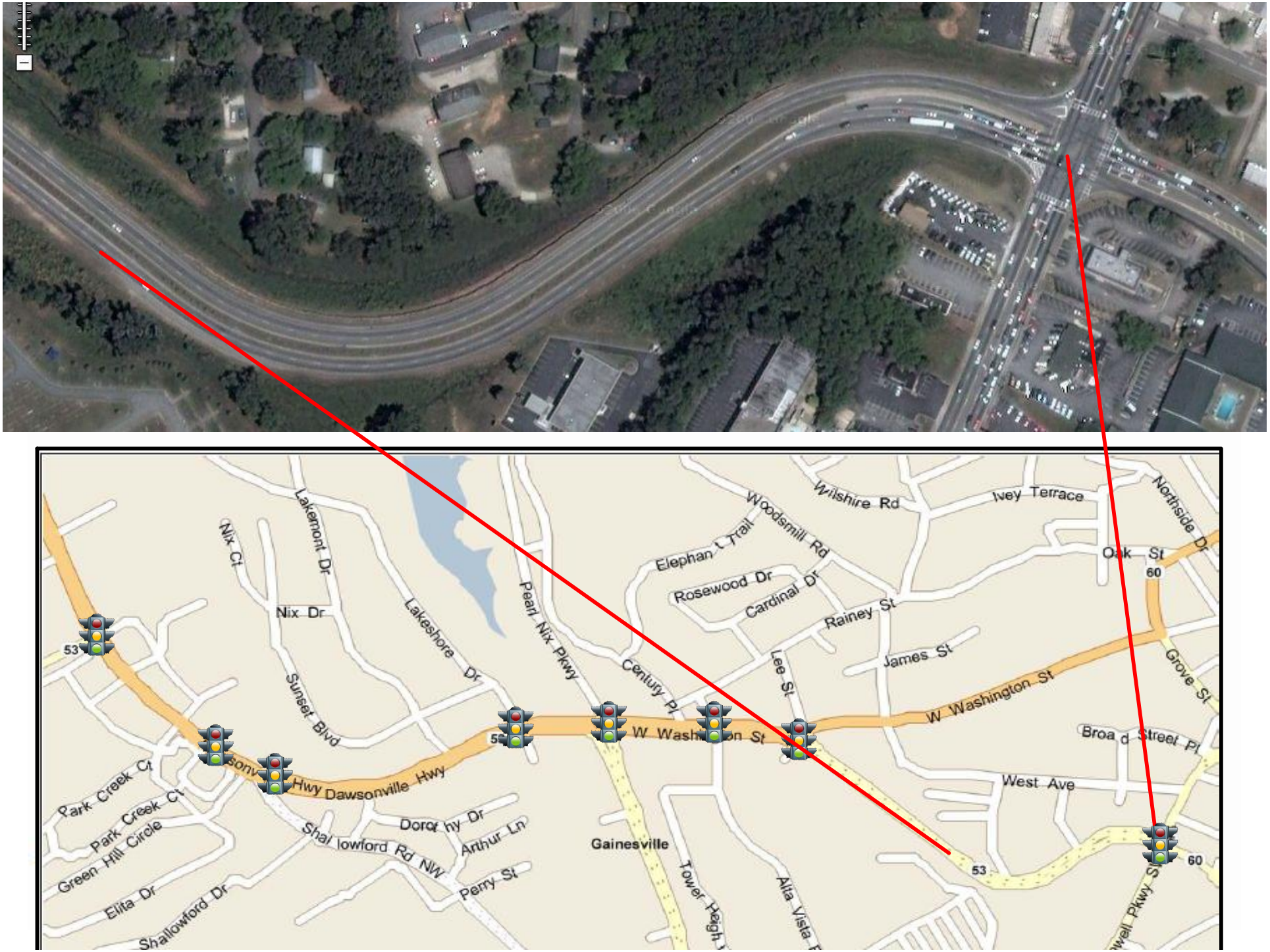
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James St
Century Pl
Lee St
Grove St
W Washington St
53
Sunset Blvd
Broa d Street Pl
Hwy Dawsonville Hwy
West Ave
Park Creek Ct
Park Creek Ct
Green Hill Circle
Dorot hy Dr
Arthur Ln
Shal lowford Rd NW
Gainesville
Elita Dr
Perry St
Shallowford Dr
Tower Heigh
Alta Vista
53
60

# Project Programming

- Should ITS be included in project?

# Project Concept

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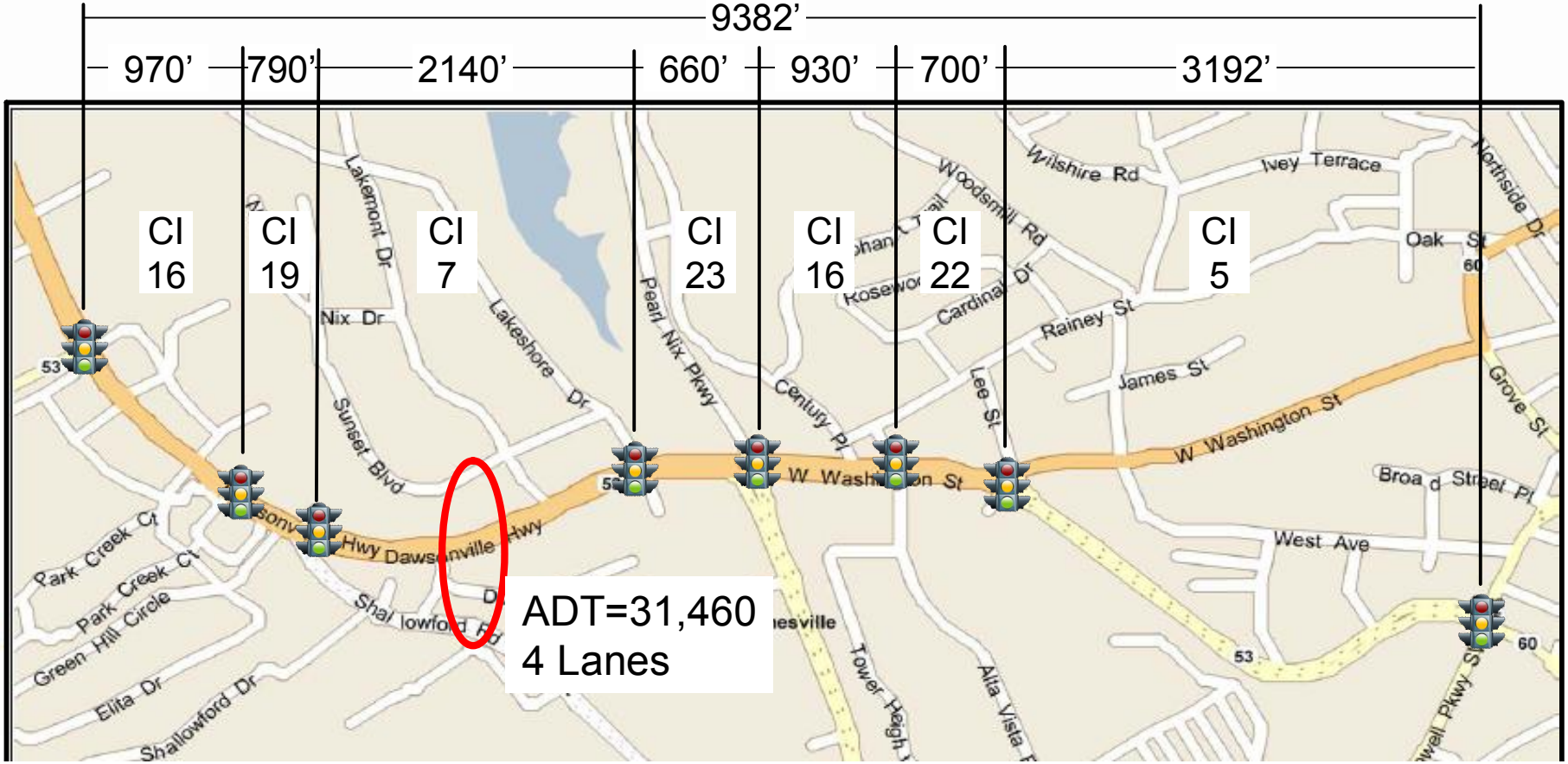

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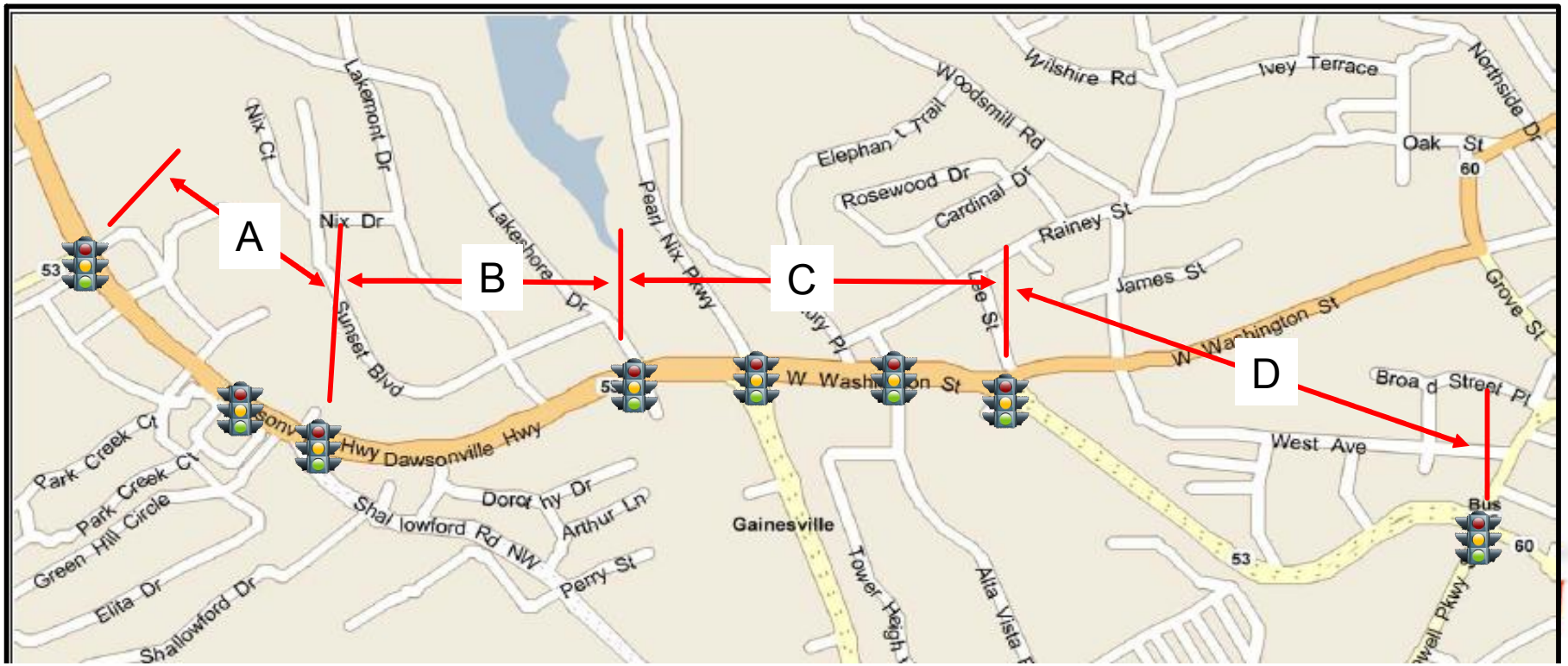
# Project Concept

- Surveillance
  - All signalized intersections
  - Continuous coverage in sections A and C
  - Some coverage in sections B and D
- All signals and devices connect back to TCC

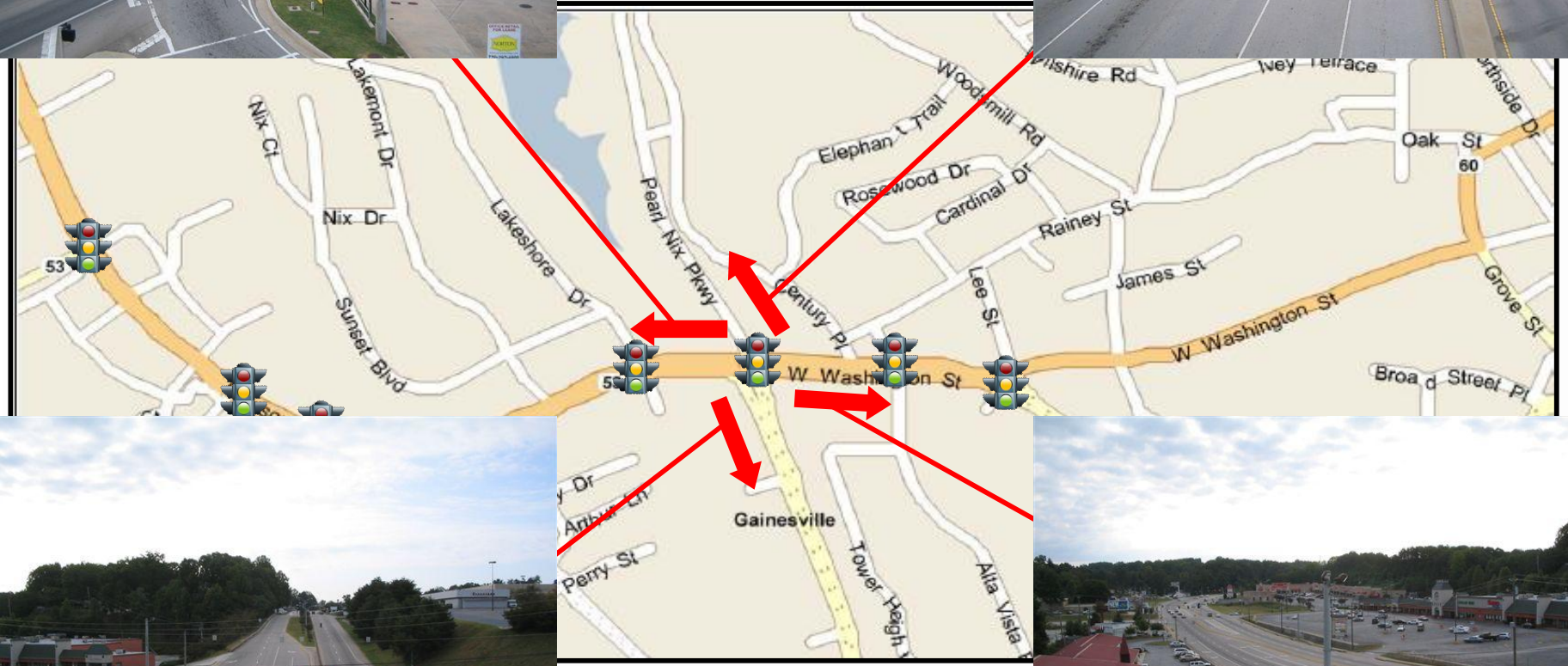


# Design




serco PBSJ

# Design





Georgia ITS Strategic Deployment Plan

# Design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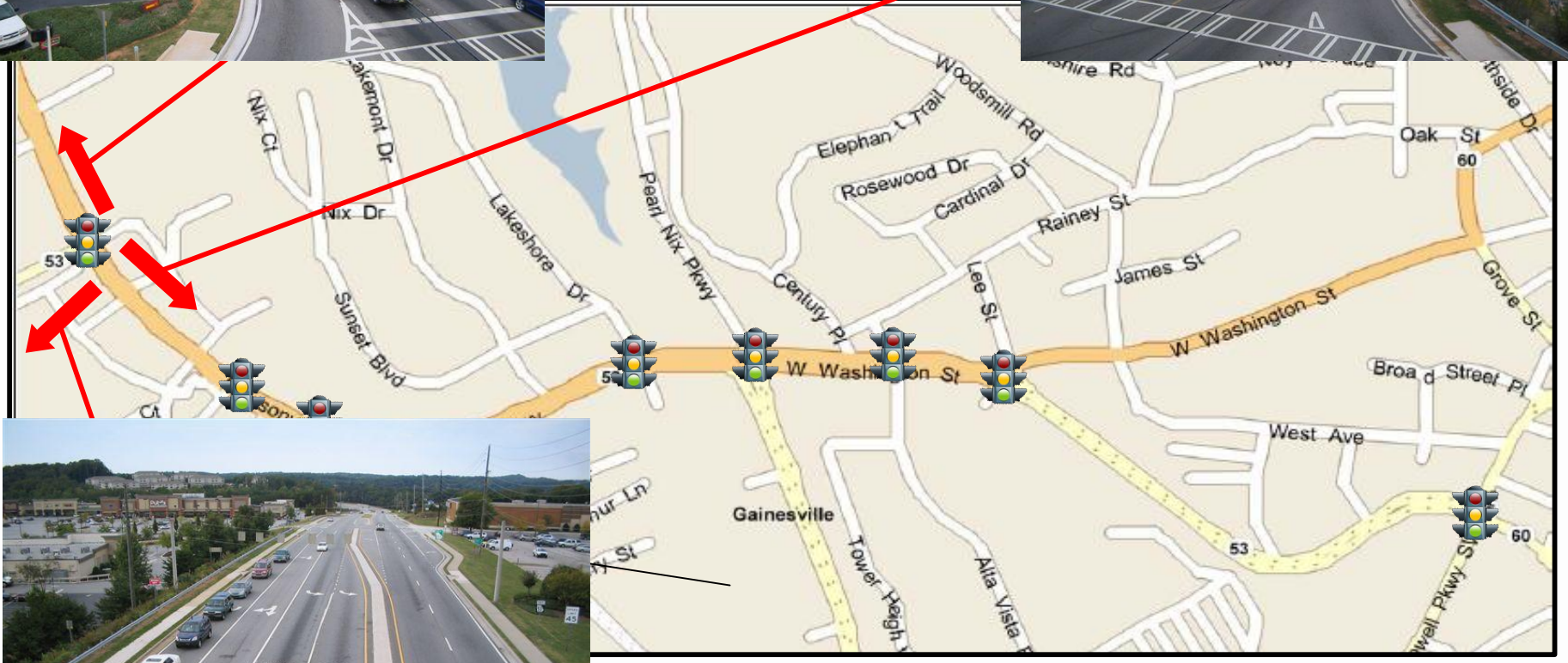
# Design



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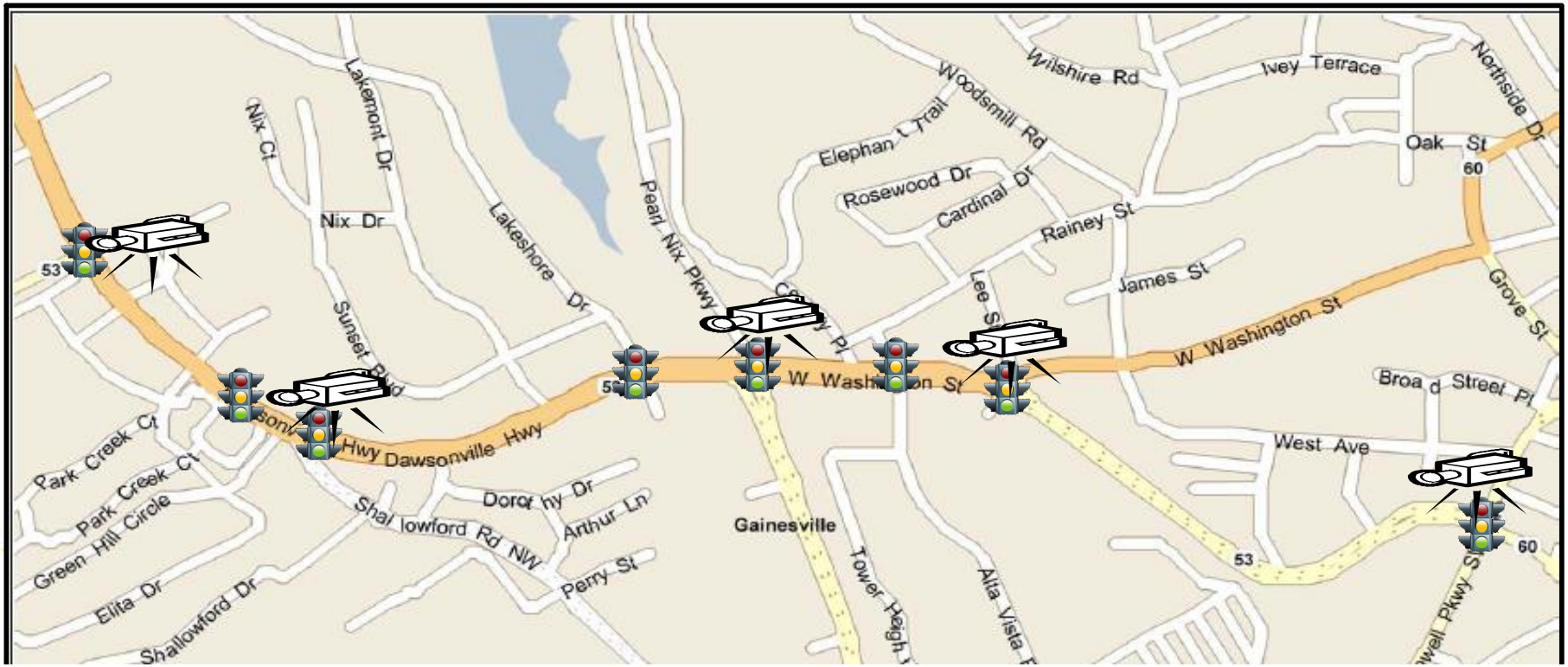
# Design

- Surveillance at 5 locations provides adequate coverage of the roadway.



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